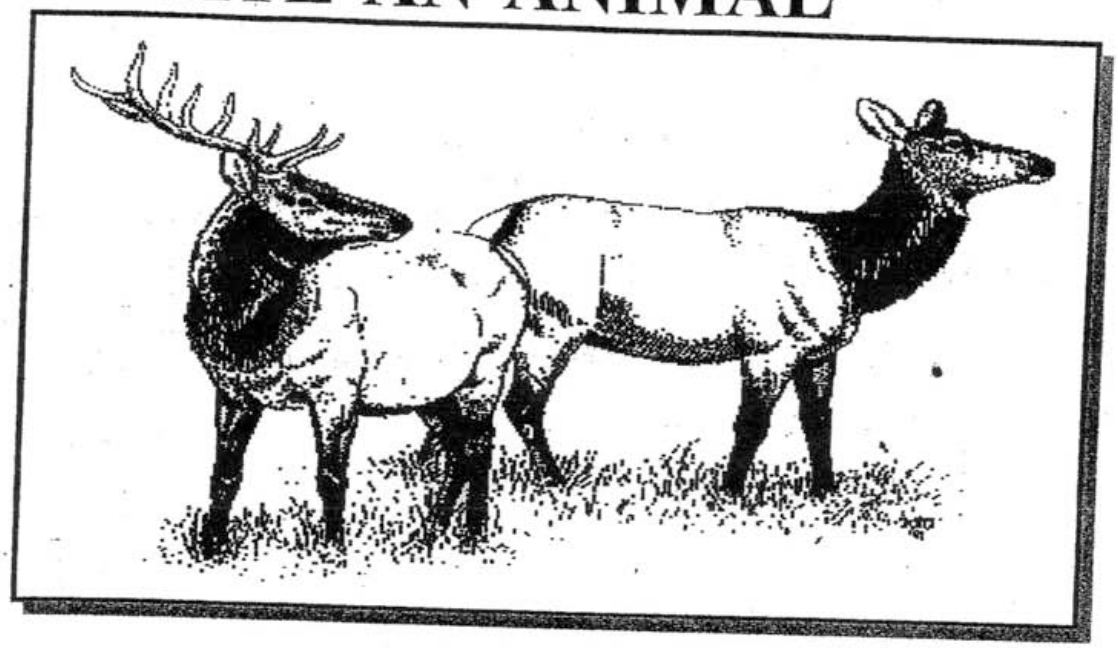
CREATE-AN-ANIMAL



Objectives Students will understand wildlife adaptations by examining animals' physical characteristics and/or behavioral and physiological adaptations that facilitate survival in specific habitats.

Background **(Grades K-12)** An adaptation, as it pertains to animals, is any physical characteristic (e.g., an eagle's talon), behavior (e.g., the Killdeer's "broken wing act"), or physiological capability (e.g., hibernation) that increases an animal's ability to survive in its environment. There are many different adaptations to match the many different types of animals. Some animals have adaptations that make them better predators,

Age: Grades K-5 (physical adaptations) 6-12 (physical, behavioral and physiological adaptations)
Subject: Science, Language Arts, Art
Skills: analysis, written and oral communication, drawing, small group work
Duration: 60 - 90 minutes
Group Size: 20 - 30 students
Setting: preferably indoors
Key Vocabulary: see Vocabulary Sheet

like the eagle, while other animals have adaptations to allow for escape, like a deer. These adaptations develop over long periods of time. This process is termed evolution or "survival of the fittest". Even animals of the same species might have different adaptations that are influenced by environmental conditions, as with the common peppered moth.

Younger students will easily grasp concepts that involve physical adaptations. Students should be able to answer, "Why do eagles have such big talons?" or "How can you tell that an owl can see well at night?". Every animal has some type of physical characteristic that can be called an adaptation. Since younger students can grasp these ideas and immediately link them to how animals survive, physical adaptations will be the focus of the lesson when dealing with K-5 students.

(Background for Grades 6-12) Older students can begin to understand that in addition to physical characteristics, behavioral and physiological adaptations facilitate survival. For lessons with 6-12 students, material should include information about some types of behaviors and capabilities, such as the Killdeer's *(Charadrius vociferus)* and Little Brown Bat's *(Myotis lucifugus)*. More advanced students can also be introduced to how environmental changes and human disturbance influence how animals adapt to their habitat (e.g., the common peppered moth).

(Physical adaptations in response to environmental changes and human disturbance)(Grades 6-12) For example, the common peppered moth (*Biston betularia*), usually light colored, was also discovered in a dark (or melanistic) form, referred to as *carbonaria*. After years of experiments, an English physician and scientist named H. B. D.

Kettlewell proved his hypothesis which gave natural selection ("survival of the fittest") as the reason for the changed color form of the common peppered moth. He deduced that the environment must have been drastically altered to give the dark form a greater survival advantage than the light form. The common peppered moth adapted to the soot covered trees which were a result of the pollution caused by heavy industry in the cities. The dark forms blended into the darker surroundings better than the light forms, therefore promoting the survival and reproduction rate of the darker forms. After many generations of dark moths passing their genetics on to their offspring, the population of the common peppered moth slowly changed from light colored to dark colored.

(Behavioral adaptations)(Grades 6-12)

Animal adaptations can also be behavioral. The Killdeer, a widely distributed and well known North American shorebird that inhabits meadows, pastures, and dry uplands, has developed an interesting behavior called "the broken wing act". If threatened by an intruding predator, the adult Killdeer will fly away from the nest and proceed to make a dramatic display of having a broken wing in order to attract the attention of the predator. When lured away from the nest towards the "easy" prey, a predator might lose the initial image and direction of the nest location. If successful in drawing the predator away from the nest, the adult Killdeer will end the act and fly to safety.

(Physiological adaptations)(Grades 9-12)

These adaptations are best illustrated by *torpor*, the ability of some mammals to drop their body temperature, slowing metabolic functions, and permitting escape during

periods of stress and unfavorable environmental conditions. Hibernation, estivation, and diurnal torpor are all forms of torpor. *Hibernation* is used by animals to survive cold weather. The term derives from Latin and means "to pass the winter". Certain mammals employ torpor during summer or autumn, this is called *estivation* (e.g., Columbian Ground Squirrel- *Citellus columbianus*). Still other mammals may only experience this state during the day, this is *diurnal torpor*.

Little Brown Bats are mammals that utilize torpor to conserve energy, especially for flight. However, only non-reproductive females and males use this adaptation. Reproductive females refrain since torpor slows metabolism to levels where fetal production and lactation stops. Instead, reproductive females have developed a behavioral adaptation to be extremely specific when selecting a roost site. Therefore, most roost sites are found in areas that are naturally thermo-efficient (i.e. insulated against temperature loss) and protected from the elements. They rely heavily upon this adaptation to provide roost sites that will help retain energy since they abstain from torpor.

Physical, behavioral, and physiological adaptations increase an animal's rate of survival. Generations that relied upon these adaptations survived to produce young with similar characteristics. There are many factors which influence the emergence of a specific adaptation. Environment, interdependence with other organisms, limiting environmental factors (any environmental force that restricts or enhances the growth of an organism), and human disturbance are a few forces that put stress on a species' structure, possibly leading to new adaptations.

Methods Students use prepared "animal" kits and drawing utensils to examine samples of physical adaptations and to create an animal of their own.

Materials one large "animal" box containing five kits with: four animal parts (paws, fur, bones, wings, etc.), drawing supplies (pencils, crayons, markers, paper, etc.), info-cards, dry-erase board or chalkboard, display table, scotch tape or masking tape (push pins). Suggested mounts: Great Horned Owl, Badger, Bobcat, Redhead Duck.

Procedure

1. Lead students in a discussion about adaptations, including vocabulary terms (refer to Vocabulary Sheet). This is a good time to use the animal mounts to show students what an adaptation is and some examples of different animals that have good adaptations. Ask students to name some of the animals and their adaptations. Encourage creativity by supplying examples such as, "badgers are excellent diggers because they have such large front claws."

2. After adequate discussion about physical adaptations and some examples of such, break the class into small groups of 4-6 students. Each group receives one kit.

3. Allow time for students to explore animal parts and read the info-cards in their kits. Teachers and facilitators should move around to each group to explain any adaptations that students don't identify on their own.

4. Students use drawing supplies to "create-an-animal". Animals should include as many adaptations as the student desires. However, the student will need to be able to explain why the animal has the adaptations it does (i.e.

sharp teeth to tear meat) and how they increase survival within its habitat. Encourage students to draw as realistically as possible, then label the different adaptations.

5. **(Teacher's decision)** Give students time to write a small essay on their animals. They should explain what type of habitat the animal lives in and how it is adapted to that particular environment. The animal should have a name and should be classified as an herbivore, carnivore, or omnivore. *Some additional questions for students to answer in their short essay are: What does the animal eat? What eats the animal? How do people use or coexist with the animal? What special behaviors or abilities does the animal have (i.e. hibernation, swimming, flying, echolocation, acute hearing, etc.)?

6. If time permits, allow each student to briefly introduce their animals to the class. Describe the various adaptations and explain where the animal lives. **If there is not enough time for each student, have one student from each group present their animals.

7. Follow the activity with a brief summary and discussion, asking students to reiterate their definitions of the vocabulary terms. Clarify any questions that students may have pertaining to physical adaptations. It is important for students to consider why there are so many types of animals and adaptations. Also, students may discover that there are additional things that allow an animal to survive.

Extensions

1. **(Grades 6-12)** Students at the 6th or higher grade level will be able to create their animals with better accuracy and plausibility. Students should provide in-depth explanations of the adaptations they chose to include in their animals (i.e. rather than just saying the badger has long claws with which to dig,

students could also include why the badger is digging). Include additional information in each kit that gives examples of behavioral and physiological adaptations. Encourage groups to work together to create an animal and have a spokesperson explain the group's reasoning to the class.

2. **(Grades 10-12)** Higher grade levels, such as 10-12, could do additional research on other adaptations. Students could visit the library and attempt to gather as many different examples of physical adaptations as possible. They could then present their findings to the class prior to the actual "create-an-animal" activity. This exercise would also create a list of adaptations from which students could choose when creating their animal.

3. **(Grades K-12)** Teachers can opt not to include any info-cards in the kits. Then students would have to figure out how the animal part increases survival.

4. **(Grades 6-12)** Have students complete a homework assignment in which they write a short story about their animal or create a fictional newspaper article about the animal that tells how the animal survives.

Evaluation

Define the terms in the vocabulary list. Explain the reasons why the "created" animal has certain adaptations. Write an essay at home about the "created" animal, which could be a creative story. Create an "Animal Olympics" and determine which animal is best suited for survival. Discuss the drawings of all the animals and present them as an art display. Have the class vote on the favorite animal and build it's own animal box (toy chest designed to look like the fictional animal).